

Monitoring Contaminants in Alaskan Peregrines



Peregrine falcon chicks
Photo by Skip Ambrose/USFWS

Arctic and American peregrine falcons (*Falco peregrinus tundrius* and *F. p. anatum*, respectively) were listed as endangered in 1970. At the time, some local populations of American peregrine falcons in the eastern United States had disappeared, and populations in western and northern North America had been reduced by 80 percent or more. Organochlorine pesticides such as DDT and its breakdown product DDE were identified as the main cause of the decline. The peregrines accumulated these chemicals in their tissues by feeding on birds that had eaten DDT-contaminated insects or seeds. These chemicals prevented normal calcium deposition during eggshell formation, and caused females to lay thin-shelled eggs that often broke before hatching. The use of DDT was restricted in the United States and Canada in the early 1970's, and populations of peregrine falcons in North America began to recover by the late 1970's.

After Arctic and American peregrine falcons were listed, the Fish and Wildlife Service prepared recovery plans for four different geographic areas. For Alaska populations, the recovery plan identified specific "index" areas (areas representative of interior and northern Alaska) to survey and specific recovery criteria for reclassification. These criteria included the number of pairs occupying territories, number of young produced, reductions in DDE residue in eggs, and minimum eggshell thickness.

In the early 1980's, biologists in the Service's Region 7 Endangered Species and Environmental Contaminant programs began a contaminant monitoring program for peregrine falcons in Alaska. This program continued

throughout the 1990's. The monitoring plan focused on DDE and eggshell thinning, and called for collecting and analyzing at least 10 eggs from each subspecies every 5 years. Unhatched eggs were also collected when visiting nests to band falcons for mortality and movement studies. We began the program in 1984 and repeated it in 1989 and 1995. During this time, we collected 153 eggs, 87 from American peregrines and 66 from Arctic peregrines.

Our analyses showed a clear downward trend of DDE concentrations in eggs. In the late 1960's, DDE residues in the range of 20-40 parts per million (ppm) and eggshell thinning in excess of 20 percent were observed for peregrine falcons in Alaska (Peakall et al 1975). Peakall (1976) reported that DDE residues in eggs in the range of 15 to 20 ppm would likely result in a declining peregrine falcon population. By 1995, DDE levels had declined to 2 to 3 ppm. Eggshell thickness also increased following the 1972 restrictions on DDT, although this increase appears to have leveled off at about 10 to 12 percent thinner than pre-DDT levels. Although shells are still thinner than in pre-DDT years, reproductive success has been good. We are unsure why eggshell thickness has not continued to improve with continuing declines in DDE. We will continue to investigate other possible causes, including other environmental contaminants.

During this monitoring effort, we were able to learn more about other aspects of contaminants. Four banded females were sampled twice during the study period, which provided insight on how residue levels in specific individuals change over time. Another 15 adult



females, whose age was known because they were color-banded as young, were sampled once. Additionally, in the early 1990's, a migration study using satellite telemetry was undertaken and some of these tagged birds (four females), with known wintering locations, were sampled for contaminants. While DDE residues varied among peregrines from various winter locations, none of the residue levels of eggs from these four females were particularly high.

The contaminant monitoring program in Region 7 has been one of the most thorough ever, even for a species as well studied as the peregrine falcon. With data collected during this program, we were able to provide detailed and scientifically credible data upon which to base the decisions to delist the Arctic and American peregrine falcons. As the FWS considers implementing post-

delisting monitoring plans, we will be developing a contaminant monitoring program similar to the one we conducted in Alaska for peregrine populations in the lower 48 States.

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References

- Peakall, D. B. 1976. The peregrine falcon (*Falco peregrinus*) and pesticides. *Canadian Field Naturalist* 90:301-307.
- Peakall, D. B., T. J. Cade, C. M. White, and J. R. Haugh. 1975. Organochlorine residues in Alaskan peregrines. *Pesticide Monitoring Journal* 8:255-260.

The peregrine falcon is one of nature's swiftest and most beautiful birds of prey. Its name comes from the Latin word peregrinus, meaning "foreigner" or "traveler." This impressive bird has long been noted for its speed, grace, and aerial skills. Now, it is also a symbol of America's recovering threatened and endangered species.

Photo by Ted Swem/USFWS